Attachment A

Response to EPA and TCEQ November 10, 2010 Comments on Draft Preliminary Site Characterization Report (PSCR)

Gulfco Marine Maintenance Superfund Site

Freeport, Brazoria County, Texas

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1	Discussion shall be added regarding whether freezing only the control samples affected the results.	The effect of freezing the laboratory control sediments on the results is unknown. The sediment used for the laboratory controls for both test species, *Leptocheirus plumulosus* and *Neanthes arenaceodentata* originated from the York River in Virginia. Standard laboratory protocol was followed by processing the sediment by first sieving, and then freezing. This processing is intended to make this sediment the most advantageous material for the growth of the organisms and to kill indigenous organisms prior to introducing the test organisms. The purpose of the laboratory control sediment is to determine the validity of the test results while minimizing test process variables. All of the laboratory control samples met the testing criteria. Text has been added to Section 2.1. It is not anticipated that this imparts any uncertainty as it follows standard procedures and is commonly done.
2	(Sec. 1.2; p. 7 & 8): The PSCR includes several statements regarding the hydrological isolation of the wetlands and ponds from Oyster Creek and tidal fluctuations. These statements are not supported by data in the PSCR or references and shall be deleted.	Text from page 7 of the draft PSCR (last sentence on page) and page 8 of the draft PSCR (last sentence of first paragraph) has been removed.
3	(Sec. 2.1.2; p. 13) The PSCR states that the most relevant comparison is site to reference/background toxicity. It should also be mentioned that biological significance (in addition to statistical significance) will be considered in the BERA.	Text has been added to Section 2.1.2 to direct the reader to Table 3 of the final PSCR (Table 7 in the draft PSCR) which is a summary of the toxicity results without statistical interpretation. Further discussion of the results will be presented in the BERA.
4	(Sec. 2.2.1; p. 14): The PSCR states that the TCEQ soil benchmarks are not available for the organics 4,4-DDT and Aroclor-1254. While there are no benchmarks for these chemicals in soil, there are benchmarks for these chemicals in sediments. Because the surface materials at the site are generally similar, whether described as soil or sediment, because the material is intermittently flooded due to tides and rainfall, and because the toxicity test had to be revised to treat the material as sediment, this statement shall be deleted, and the	Marine sediment benchmarks have been added to Section 2.2.1 for the North Area Soils and to Table 4 of the final PSCR (Table 1 in the draft PSCR).

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	sediment benchmarks shall be included for these chemicals.	
5	(Sec. 2.3.1; p. 16 and p. 20): There is a difference noted in the RI/FS media data compared to the media data from 2010. The PSCR shall state whether the RI/FS data is pre- or post-Hurricane Ike.	The sediment sampling for the Remedial Investigation (RI) occurred prior to Hurricane Ike's landfall in September 2008. The last phase of sediment sampling to support the RI was in June of 2008. Text has been added to Section 2.6 (Potential Sources of Uncertainty).
6	(Sec. 2.3.2; p. 19): It was noted that control failure of the Artemia test occurred at 96 hours in the third test run for the surface water acute toxicity testing. Discussion shall be added regarding whether this met acceptability criteria for the control. The PSCR shall also include a discussion of why the level of acute mortality did not match the slight benchmark exceedances.	The test protocol was based on an approved modification of a 48-hour brine shrimp bioassay procedure (SPE, 1978). The modified procedure attempted to increase a standard 48-hour test to a duration of 96-hours. However, the control survival was less than 90% acceptable criteria at 96 hours. In the first test conducted September 16 to September 20, control survival for all three site samples met the acceptance criteria at 48 hours (standard test conditions) but did not meet the acceptance criteria at 72-hours and 96-hours. In the third test run conducted September 29 to October 3, control survival for EWSW01 and EWSW03 met the acceptance criteria at 48 hours (standard test conditions) but the control survival for EWSW04 was slightly less than the acceptance criteria (86% versus 90%). The acute mortality in EWSW03 does not match the slight benchmark exceedance due to a lack of reproducibility in the Artemia survival for this sample. The 100% surface water samples (undiluted) for EWSW01 and EWSW04 exhibited survival rates of 97% and 99% in the first test, respectively, and 80% and 96% in the third test, respectively, after 48-hours, indicating reproducibility in the test. Conversely, the 100% surface water sample for EWSW03 exhibited survival rates of 100% and 0% in the first and third tests, indicating irreproducibility in the test. Text has been added Section 2.6 (Potential Sources of Uncertainty).
7	(Table 1): The soil benchmarks for barium (300 mg/kg) and for chromium (30 mg/kg) are different from the benchmarks listed in Table 6 of the Baseline Ecological Risk Assessment Work	The benchmarks have been made consistent with Table 6 from the BERA WP & SAP. Marine sediment benchmarks have been added to Table 4 of the Final PSCR (Table 1 in the draft PSCR).

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	Plan and Sampling and Analysis Plan (BERA WP & SAP), which are 330 mg/kg and 0.4 mg/kg, respectively. The benchmarks for barium and chromium shall be corrected to the values listed in the BERA WP & SAP.	
8	(Table 2): No benchmarks are provided for endrin aldehyde, endrin ketone, benzo(g,h,i) perylene, indeno (1,2,3-cd) pyrene. The BERA WP & SAP lists benchmarks for these chemicals, and these benchmarks shall be included in the PSCR.	The benchmarks have been made consistent with Table 6 from the BERA WP & SAP.
9	(Table 2 and Table 6): It is acknowledged that the laboratory ran a canned statistical package on the comparison between reference/background samples and the laboratory controls. However, any statistics that indicated there is no significant difference between the 81.5% survival (lab control for amphipod) and 33% survival (EWSED08), and 19% survival (EWSED09), and 42% survival (EIWSED06) appears suspect. This apparent discrepancy shall be revisited/addressed.	The statistical analysis for the toxicity results is presented in Appendix B. The comparison between the laboratory control for the *Leptocheirus* 28-day test and the reference/background samples showed no significant effect for EIWSED06 and EWSED08, but did show a significant effect for EWSED09. Table 5 has been corrected. As discussed in Section 3.7 of the BERA WP & SAP (Acceptance Criteria and Decision Errors), the null hypothesis can be stated generally as "there is no increase in adverse effects between a site sample and the reference or control sample." The false rejection rate (α) was set at $P < 0.05$. Therefore, significant differences (rejection of the null hypothesis) for the toxicity tests are set at $P < 0.05$ and only those tests, when compared to a control, were considered to have significant differences, irrespective of the percent survival. The P-values for EIWSED06 and EWSED08 when compared to the lab control were 0.3215 and 0.0620, respectively, indicating non-significant differences. For EWSED09, compared to the lab control, the P-value was 0.0026 indicating a significant effect.
10	(Table 2 and Figure 4): Regarding the analysis results for 2-methylnapthalene in sample EWSED05, Table 2 shows the result as a low concentration for gradient purposes, while in Figure 4 the same result is shown as a high concentration. This inconsistency shall be corrected, and all of the concentration characterizations in the tables and figures shall be reviewed for	The identified inconsistency has been corrected. All of the tables and figures have been reviewed for consistency. None of the detections of 2-methylnaphthale from the wetland sediments were greater than the marine benchmark of 0.07 mg/kg and are all considered low, therefore Figure 4 shows that the concentration of 2-methylnaphthalene is purple (low).

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	accuracy and corrected as necessary.	
11	(Figures 3, 4, 6 and 7): The analysis results on these figures do not include units. The sample result units shall be added to these figures.	Units have been added to the legend on the figures.
12	Any available observations (both field and laboratory) describing/documenting the presence of benthic invertebrates in collected site sediment samples shall be included and discussed. If a lack of invertebrates in both site and reference/background samples is observed, it may be indicative of harsh conditions.	For the Wetland Sediment area, Benchmark Environmental Services, Inc. observed fiddler crabs at all marsh sediment sample stations, including the reference/background locations. Text has been added to Section 2.3. Benchmark Ecological Services, Inc. observed benthic invertebrates in all sediment samples collected in the Intracoastal Waterway (ICWW) including the reference/background locations. The organisms were not formally identified in the field but the most abundant organisms appeared to be polychaete worms (i.e., *Neanthes*). Mud crabs and snapping shrimp were observed in some ICWW samples. Text has been added to Section 2.4.
13	The PSCR shall note whether any ammonia and pH data were collected with the field data. And include any such results in the PSCR.	Ammonia readings were not collected in the field. Ammonia tests were completed by the toxicity laboratory on overlying sediment water daily and on surface water at sample receipt. These data are in Appendix B and a reference has been added directing the reader to Section 2.1 (Toxicity Testing). The pH data were collected in the field and are shown, along with other field-collected data, on Table 1 (water) and Table 2 (sediment) in the final PSCR. A reference to Tables 1 and 2 has been added to the text in Section 2.1 (Media Sampling).
14	The PSCR shall state whether any samples were archived and whether there are any remaining sample holding times.	The Work Plan did not require archiving of samples and thus no analytical samples have been formally archived for this project. Each laboratory utilized, PBS&J and Columbia Analytical Services, followed their own internal procedures for ultimate residual sample disposal. Text has been added to Section 2.1 stating that there are no analytical samples formally archived for this project.

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References:

Society of Petroleum Engineers (SPE) [Palmer, L.L.], 1978. Brine Shrimp Bioassay Procedure for Determining Produced Water Toxicity. American Institute of Mining, Metallurgical and Petroleum Engineers, Inc.